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KAUTH , POMEROY , PECK & BAILEY ,LLP
P.O. BOX 19152
IRVINE, CA 92623

EXAMINER
BROWN JR, NATHAN H

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/560,666	HERCUS, ROBERT GEORGE
	Examiner	Art Unit	
	Nathan H. Brown, Jr.	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *(3)* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *19 June 2007*.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *103-209* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *103-209* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All   b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Examiner's Detailed Office Action

1. This Office Action is responsive to the communication for application 10/560,666,

filed June 19, 2007.

2. Claims 103-209 are pending. Claims 103-209 are new. Claims 1-102 are cancelled.

3. After the previous office action, claims 1-102 stood rejected.

Claim Rejections - 35 USC § 112, 1st

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and
> process of making and using it, in such full, clear, concise, and exact terms as to enable any person
> skilled in the art to which it pertains, or with which it is most nearly connected, to make and use
> the same and shall set forth the best mode contemplated by the inventor of carrying out his
> invention.

5. Claims 103-137, 138-147, 148-151, 152-155 are rejected under 35 U.S.C. 112, first

paragraph, as failing to comply with the enablement requirement because the claims lack

utility. Since the claims lack utility, the claims contain subject matter, which was not

described in the specification in such a way as to enable one skilled in the art to which it

pertains, or with which it is most nearly connected, to use the invention.

6. Claims 156-163 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement because the claims lack utility. Since the claims lack utility, the claims contain subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention.

7. Claims 164-171 and 172-209 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement because the claims lack utility. Since the claims lack utility, the claims contain subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention.

Claim Rejections - 35 USC § 101

8. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

9. Claims 103-137, 138-147, 148-151, 152-155 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter: mathematical abstraction and/or software per se. New independent claims 103, 138, 148, and 152 recite a "neural network" or "artificial neural network" comprising "a plurality of

neurons" and "each of the plurality of neurons being a processor with memory and being

in an array". Examiner notes that the Specification asserts:

> Each neuron is represented by a single fixed length node in a conventional array
> or structure. The number of neurons that may be stored in an array will be
> dependent on the total memory storage available (intemal and/or external), and on
> the pointer...(see p. 17, lines 1-3)

> In the preferred mode, new elemental neurons can be added at anytime, anywhere
> in the neural structure, providing for complete flexibility. When using a
> predefined area for the elemental neurons, processing may be faster asthere is no
> need to search a list of successors attached to the root neuron. (see p. 23, lines 16-
> 20)

> In the preferred mode, new successor neurons to an initiating neuron are simply
> added to the front of the list. Therefore, they are attached directly to the initiating
> neuron. In this way recent memory traces are readily expressed. (see p. 23, lines
> 32-34)

> In this manner the order of the list can be used to represent the relative synaptic
> strengths or activation levels of the successor neurons to an initiating neuron
> without having to use weights to represent the strength of synaptic connections, if
> so desired. (see p. 24, 12-14)

> The neural network structure and processes described above may be implemented
> in software or hardware. If in hardware, they may be part of a chip, all of a
> dedicated chip, or an array of chips, all being elemental and or structural neurons.
> Elemental and structural neurons may be in part of the chip, or may be in a
> memory array of dedicated neurons. (see p. 27, lines 12-16)

Clearly, in hardware or software new elemental neurons cannot be added at anytime,

anywhere in the neural structure, so the claimed invention is either an abstract

mathematical model and/or software per se. Claims 104-137, 139-147, 149-151, 153-155

recite only detailed mathematical and operational limitations for the independent claims.

Since claims 104-137, 139-147, 149-151, 153-155 depend from independent claims 103,

138, 148, and 152 without curing the deficiencies of the claims, claims 103-137, 138-147,

148-151, 152-155 are considered non-statutory under 35 U.S.C. 101.

10. Claims 103-137, 138-147, 148-151, 152-155 rejected under 35 U.S.C. 101 because

the claimed invention lacks patentable utility. Although, claim 137 recites a number of

application areas for neural networks, no substantial and specific result in any area of

application is recited. Since claims 104-137, 139-147, 149-151, 153-155 depend from

independent claims 103, 138, 148, and 152 without curing the deficiencies of the claims,

claims 103-137, 138-147, 148-151, 152-155 are considered non-statutory under 35

U.S.C. 101.

11. Claims 156-163 are rejected under 35 U.S.C. 101 because the claimed invention is

directed to non-statutory subject matter: mathematical abstraction and/or software per se.

New independent claim 156 recites a "neuronal assembly for use in an artificial neural

network" having no associated hardware, data structure, or functional descriptive

language. Claim 156 is clearly recites only the 101 judicial exceptions of mathematical

abstraction and/or software per se. Claims 157-163 recite only detailed mathematical and

operational limitations for the independent claim. Since claims 157-163 depend from

independent claim 156 without curing the deficiencies of the claim, claims 156-163 are

considered non-statutory under 35 U.S.C. 101.

12. Claims 156-163 are rejected under 35 U.S.C. 101 because the claimed invention

lacks patentable utility. Claims 156-163 recite no substantial and specific result nor does

the Specification disclose a substantial and specific result for a "neuronal assembly" in

any of the application areas it lists. Since claims 157-163 depend from independent

claim 156 without curing the deficiencies of the claim, claims 156-163 are considered

non-statutory under 35 U.S.C. 101.

13. Claims 164-171 and 172-209 are rejected under 35 U.S.C. 101 because the claimed

invention is directed to non-statutory subject matter: mathematical abstraction. New

independent claims 164 and 172 recite a "method for creating an association of neurons

in an artificial neural network having a plurality of neurons" and "method of operating a

neural network comprising a plurality of neurons", respectively. The final results for the

claims are "activating or producing an output from the associated neuron to potentiate

and activate the associating neuron, the associating neuron then being activated and able

to produce an output" and "creating processes for expression of the plurality of neurons",

respectively. In each case, the claims recite a process reciting a set of functional steps

having no physical transformation and no substantial or specific final result. Examiner

considers neural networks to simply form a mapping from one vector space to another

therefore the final results of the claims can be no more than elements of such a mapping

or contributors to such a mapping. In either case, they are mathematical abstractions.

Claims 165-174 and 173-209 simply recite further mathematical limitations to

independent claims 164 and 172. data structure and no descriptive language that define

any structural and functional interrelationships between the data structure and other

claimed aspects of the invention which permit the data structure's functionality to be

realized. Claims 1-20, 21-30, 31-32, and 97-102 are therefore a non-functional

descriptive listing of parts of a mathematical abstraction and are therefore non-statutory

under 35 U.S.C. 101. Examiner notes that although claim 102 recites a number of useful

applications of neural networks, no useful, concrete, or tangible result in any area of

application is recited.

14. Claims 164-171 and 172-209 are rejected under 35 U.S.C. 101 because the claimed

invention lacks patentable utility. Although, claim 207 recites a number of application

areas for neural networks, no substantial and specific result in any area of application is

recited. Since claims 165-174 and 173-209 depend from independent claims 164 and 172

without curing the deficiencies of the claims, claims 164-171 and 172-209 are considered

non-statutory under 35 U.S.C. 101.

Claim Rejections - 35 USC § 102

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. Claims 103, 138, 148, 152, 156, 164, and 172 are rejected under 35 U.S.C. 102(b) as

being anticipated by *Baji et al.* (*Baji*) (USPN 5,091,864).

Regarding claim 103. (New) *Baji* teaches a neural network comprising:

(a) a plurality of neurons (*see* Abstract and Fig. 2, *Examiner interprets "systolic*

processor elements SPE-1 (I+1 to M)" to be a plurality of neurons.),

(b) each of the plurality of neurons being, a processor with memory and being in an array

(*see* above, *Examiner interprets "SPE" to be a processor in an array.*):

(c) the plurality of neurons comprising a plurality of structural neurons (*see* Abstract,

Examiner interprets a "SPE" to be either a structural or elemental neuron.);

(d) all elemental and structural neurons being configured to be associated with others of

the elemental and structural neurons via active connections (*see* col. 3, lines 3-44,

Examiner interprets each "shift register" and "input data...feedback line" to comprise

the active connections between SPEs (i.e., neurons).);

(e) each elemental neuron being configured to:

(i) represent a unique value input into the artificial neural network system (*see*

Fig. 1, Item 5, *Examiner interprets the "INPUT DATA LATCH 1" to represent a unique*

value input into the artificial neural network system.), the unique value being at least one

selected from the group consisting of: a stimulus, an event, events, a sequence in a

pattern, a sequence of events, an elemental stimulus, a defined elemental patters, a

defined elemental data element, a basic input stimulus, and an output stimulus of

information being processed (*see* col. 2, lines 55-58, *Examiner interprets "frames of*

information per second" to be a sequence of events.); and

(ii) express that unique value as an output when activated by a structural neuron

(*see* Fig. 1, Item 7, *Examiner interprets the "OUTPUT DATA LATCH" to represent a*

unique value as output.);

(f) each structural neuron being configured to:

(i) receive input from a pair of neurons of the plurality of neurons and with

which it is an associating neuron (*see* Abstract, *Examiner interprets the*

"multiplexor" to be able to associate any two SPEs with any other.); and

(ii) express that input as an output to that pair of neurons to activate the

pair of neurons for expression (*see* above).

Regarding claim 138. (New) *Baji* teaches an artificial neural network comprising:

(a) a plurality of neurons (*see* Abstract and Fig. 2, *Examiner interprets "systolic*

processor elements SPE-1 (1+1 to M)" to be a plurality of neurons.),

(b) each of the plurality of neurons being a processor with memory and being in an array

(*see* above, *Examiner interprets "SPE" to be a processor in an array.*); (c) the plurality

of neurons comprising a plurality of elemental neurons and a plurality of structural

neurons (*see* Abstract, *Examiner interprets a "SPE" to be either a structural or*

elemental neuron.);

(d) all elemental and structural neurons being configured to be associated with others of

the elemental and structural neurons via active connections (*see* col. 3, lines 3-44,

Examiner interprets each "shift register" and "input data...feedback line" to comprise

the active connections between SPEs (i.e., neurons).);

(e) each elemental neuron being configured to:

(i) represent a unique value able to be input into the artificial neural network

system, the unique value being one of: a stimulus, an event, events, a sequence in a

pattern or sequences of events (*see* col. 2, lines 55-58, *Examiner interprets "frames of*

information per second" to be a sequence of events.); and

(ii) express that unique value as an output (*see* Fig. 1, Item 7, *Examiner interprets*

the "OUTPUT DATA LATCH" to represent a unique value as output.); and

(f) each structural neuron being configured to

receive input from a pair of neurons: with which it is associating, the pair of

neurons being selected from the group consisting of:

both elemental neurons,

both structural neurons,

one structural and one elemental neuron, and

one elemental neuron and one structural neuron (*see* Abstract, *Examiner*

interprets the "multiplexor" to be able to associate any two SPEs with any other.).

Regarding claim 148. (New) *Baji* teaches an artificial neural network comprising:

(a) a plurality of neurons (*see* Abstract and Fig. 2, *Examiner interprets "systolic*

processor elements SPE-1 (I+1 to M)" to be a plurality of neurons.),

(b) each of the plurality of neurons being a processor with memory and being in an array

(*see* above, *Examiner interprets "SPE" to be a processor in an array.*);

(c) the plurality of neurons comprising a plurality of elemental neurons and a plurality of

structural neurons (*see* Abstract, *Examiner interprets a "SPE" to be either a structural or*

elemental neuron.);

(d) all elemental and structural neurons being configured to be associated with others of

the elemental and structural neurons via active connections (*see* col. 3, lines 3-44,

Examiner interprets each "shift register"and "input data...feedback line" to comprise

the active connections between SPEs (i.e., neurons).);

(e) each elemental neuron being configured to:

(i) represent a unique value able to be input into the artificial neural network

system, the unique value being at least one selected from the group consisting of: a

stimulus, an event, events, a sequence in a pattern, a sequence of events, an elemental

stimulus, a defined elemental pattern, a defined elemental data element, a basic input

stimulus, and an output stimulus of information being processed (*see* col. 2, lines 55-58,

Examiner interprets "frames of information per second" to be a sequence of events.); and

(ii) express that unique value as an output (*see* Fig. 1, Item 7, *Examiner interprets*

the "OUTPUT DATA LATCH" to represent a unique value as output.);

(f) all of the plurality of structural neurons being able to be expressed in terms of the

elemental neurons from which they were derived or represent (*see* Abstract, *Examiner*

interprets the "multiplexor" to be able to express any two SPEs in terms of any other.).

Regarding claim 156. (New) *Baji* teaches a neuronal assembly for use in an artificial

neural network (*see* Fig. 2 and Abstract), the neuronal assembly comprising an initiating

neuron (*see* Abstract, *Examiner interprets a "SPE" to be either an initiating or*

associated neuron.), an associated neuron (*see* above), and an associating neuron

operatively connected to the initiating neuron and the associated neuron (*see* col. 3, lines

3-44, *Examiner interprets each "shift register"and "input data...feedback line" to*

comprise the active connections between SPEs (i.e., neurons).).

Regarding claim 164. (New) A method for creating an association of neurons in an

artificial neural network having a plurality of neurons, one of the plurality of neurons

being an initiating neuron, another of the plurality of neurons being an associated neuron,

and a further neuron of the plurality of neurons being an associating neuron; the method

comprising: activating or producing an output from the initiating neuron to potentiate the

associating neuron; and activating or producing an output from the associated neuron to

potentiate and activate the associating neuron, the associating neuron then being activated

and able to produce an output (see col. 19, lines 17-21).

Correspondence Information

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Nathan H. Brown, Jr. whose telephone number is 571-

272- 8632. The examiner can normally be reached on M-F 0830-1700. If attempts to

reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony

Knight can be reached on 571-272-3687. The fax phone number for the organization

where this application or proceeding is assigned is 703-872-9306. Information regarding

the status of an application may be obtained from the Patent Application Information

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Anthony Knight
Supervisory Patent Examiner
Tech Center 2100

Nathan H. Brown, Jr.
January 19, 2007